

Amendments to the Specification

Please amend the following paragraphs in the Specification:

[0009] FIG. 1 illustrates a top plan view of a prior art lateral MOSFET device;

[0021] Preferably, source regions 34 and drain contact regions 36 comprise elongated stripe shapes, are substantially parallel to each other, and have a similar or substantially equal length.

In the embodiment shown, source regions 34 and drain contact regions 36 comprise highly doped n-type regions, and well regions 38 comprise more lightly doped n-type regions. As shown in FIG. 3, well regions 38 preferably include a pair of opposing rounded tips or ends.

~~[0022] — comprise elongated stripe shapes, are substantially parallel to each other, and have a similar or substantially equal length. In the embodiment shown, source regions 34 and drain contact regions 36 comprise highly doped n-type regions, and well regions 38 comprise more lightly doped n-type regions. As shown in FIG. 3, well regions 38 preferably include a pair of opposing rounded tips or ends.~~

~~[0023]~~ [0022] Source regions 34 are formed within P+ body regions, PHV or doped regions 41 (shown in FIG. 4), which have a higher dopant concentration than body of semiconductor material 32. Preferably, doped regions 41 completely surround well regions 38 and therefore, are absent or without fingertip regions as required by prior art device 10 (i.e., fingertips 18 shown in FIG. 1). This eliminates the regions of high electric field stress caused by small radius of curvature or narrower fingertips. That is, the design and/or shape of doped regions 41 provide a reduced electric field stress and an enhanced blocking voltage capability.

~~[0024]~~ [0023] Contact or doped regions 42 are formed within high voltage doped regions 41, and comprise, for example, a highly doped p-type material. Doped regions 42 increase the integrity of the source to substrate connection as well as reduce the device's susceptibility to parasitic bipolar effects.

~~[0025]~~ [0024] Gate structures 44 are formed over major surface 33 and comprise a thin dielectric layer 47 and a doped polycrystalline layer or material 46, which provides a gate contact. Field isolation regions 43 provide surface isolation between drain regions 39 and source regions 34. A preferred p-top, doped, or resurf layer or region 49 is included within well region 38 to reduce surface field effects within well region 38, and to improve on resistance. In the embodiment shown, doped region 49 comprises a p-type conductivity material. Doped region 49 is either grounded or left floating.

~~[0026]~~ [0025] A first metal or conductive layer 51 is formed on major surface 33 in contact with source regions 34, doped regions 42, drain contact regions 36, and gate structures 44. Preferably, conductive layer 51 comprises an aluminum silicon alloy. A first interlayer dielectric layer (ILD) or dielectric layer 53 is formed over gate structures 44 and field isolation regions 44 to isolate gates structures 44 from first conductive layer 51. A second interlayer dielectric (ILD) 54 is formed over first interlayer dielectric 54 and first conductive layer 51.

~~[0027]~~ [0026] According to the present invention, a second or different metal or conductive layer 57 is coupled to drain contact regions 36 through an opening or via 58 in interlayer dielectric layer 54. Additionally, second conductive layer 57 is coupled to source regions 34 and gate structures 44 through vias 59 and 60 as shown. Preferably, second conductive layer 57 comprises an aluminum silicon alloy, and is formed subsequently to first conductive layer 51. First and second interlayer dielectrics 53 and 54 comprise, for example, deposited oxides, and have a total thickness on the order of 15,000 to 20,000 Angstroms.

~~{0028}~~ [0027] Although two ILD layers are shown, more or less ILD layers may be used. Additionally, more than two metal layers may be used together with additional ILD layers, and a subsequent conductive layer is used to tie the drain regions together. This subsequent conductive layer would then be considered a second conductive layer, which is coupled through intervening conductive layers to the drain regions. Non-interdigitated drain regions 39 together with interlayer dielectrics 53 and 54 and first and second conductive layers 51 and 57 provide a more robust structure because they provide for the elimination of PHV region fingertips.

~~{0029}~~ [0028] A source pad (not shown) is coupled to first conductive layer 51 through a via in ILD layer 54, and comprises, for example, the same material used to form first conductive layer 51 second conductive layer 57. Likewise, a gate pad (not shown) is coupled to gate structure 44 through a via and contact in ILD layers 53 and 54, and comprises, for example, the same material used to form first conductive layer 51 and/or second conductive layer 57. The source and gate pads may be placed around structure 30 where convenient.

~~{0030}~~ [0029] The structure 30 according to the present invention is a non-interdigitated finger design where PHV region fingertips are eliminated without sacrificing blocking voltage capability and specific on-resistance characteristics. By non-interdigitated, the authors mean, for example, a structure that is absent a common diffused region (e.g., common diffused region 17 shown in FIG. 1) within the body of semiconductor material that interconnects the drain fingers. Instead, the present invention utilizes a PHV region that substantially surrounds drain regions 39 and a second conductive layer 57 to tie drain regions 39 together. More specifically, structure 30 comprises isolated drain contact regions 36 that are tied together with one more levels of conductive material.

~~{0031}~~ [0030] FIG. 5 illustrates an enlarged cross-sectional view of structure 30 taken along reference line 5-5 to show one

embodiment where first conductive layer 51 and second conductive layer 57 do not overlap. That is, FIG. 5 shows portions 63 of first conductive layer 51 terminating in proximity to second conductive layer 57. In applications where high blocking voltage capability is required, this structure is preferred to avoid high electric field stresses on interlayer dielectrics 53 and 54, which can occur when first conductive layer 51 is grounded and second conductive layer 57 is at a high voltage or potential.

~~{0032}~~ [0031] FIG. 6 illustrates an enlarged cross-sectional view of structure 30 taken along reference line 6-6 to show an alternative embodiment where first conductive layer 51 and second conductive layer overlap, but the two conductive layers are separated and insulated by interlayer dielectric 54. The overall thicknesses of interlayer dielectrics 53 and 54 are adjusted to withstand the specific field stresses of a given device.

~~{0033}~~ [0032] FIG. 7 illustrates an enlarged cross-sectional view of structure 30 taken along reference 7-7 to show an embodiment where a portion of second conductive layer 57 is over, runs over, or passes over where a portion of well region 38 terminates in body of semiconductor material 32.

~~{0034}~~ [0033] An additional advantage of structure 30 is that it is scalable to multiple or a plurality of drain regions 39 depending on current carrying requirements. Also, structure 30 is easily scalable to different blocking voltages by changing drift length (L_d) (dimension 61 in FIG. 4). For example, for a >700 volt device, L_d is on the order of 60 microns, for a >500 volt device, L_d is on the order of 40 microns, and for a >200 volt device, L_d is on the order of 14 microns. An additional advantage is that structure 30 is symmetrical in any direction, which provides design layout flexibility.

~~{0035}~~ [0034] A further advantage is that the drain finger design is flexible to include long drain fingers stacked side-by-side and/or to include smaller drain fingers stacked top-to-down and side-by-side using second conductive layer 57 is tie the drain regions together. Moreover, because structure 30

eliminates cut-out regions 21 and common diffused regions 17, overall device area is reduced thereby improving or reducing specific on-resistance. For example, a 700 volt structure 30 showed about a 10% reduction in specific on-resistance compared to a 700 volt device 10. Additionally, under high temperature blocking bias (HTBB) testing, structure 30 showed an increase of about 20 volts in blocking voltage after 1000 hours compared to device 10, which showed a 10 to 20 volt degradation after 1000 hours.

~~{0036}~~ [0035] Thus it is apparent that there has been provided, in accordance with the present invention, a lateral FET structure having improved blocking voltage and specific on-resistance performance. The structure further provides design flexibility compared to the prior art, which improves design costs and reduces design cycle time.

~~{0037}~~ [0036] Although the invention has been described and illustrated with reference to specific embodiments thereof, it is not intended that the invention be limited to these illustrative embodiments. For example, in the preferred embodiment shown herein, a first conductive layer is shown coupled to the source regions and a second conductive layer is shown coupled to the drain regions with the two conductive layers separated by an ILD layer. This order can be reversed where the first conductive layer is coupled to the drain regions, and the second conductive layer is coupled to the source regions. Those skilled in the art will recognize that modifications and variations can be made without departing from the spirit of the invention. Therefore, it is intended that this invention encompass all such variations and modifications as fall within the scope of the appended claims.